

BREMERTON GAS WORKS SUPERFUND SITE STATUS UPDATE

March 22, 2018

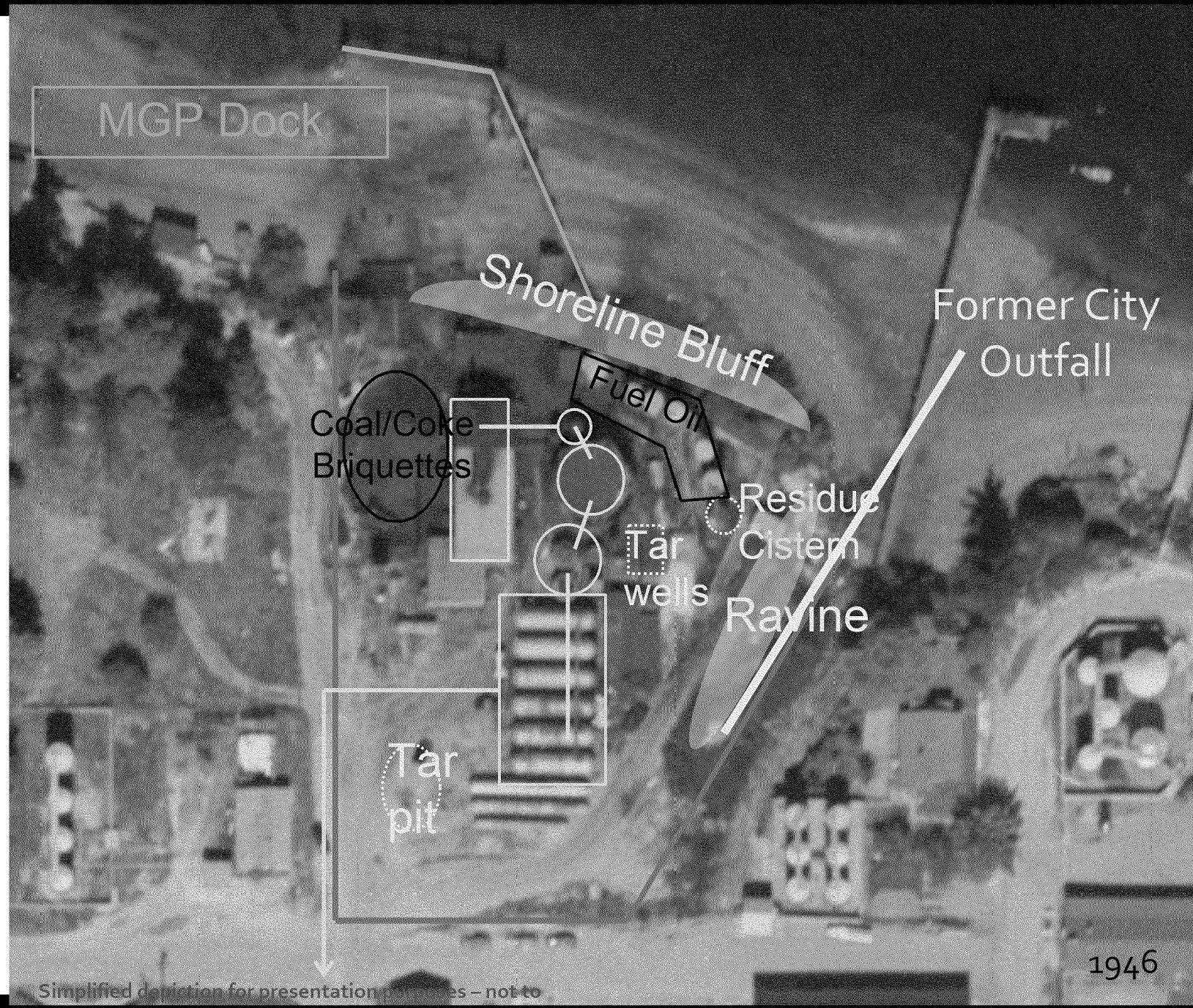


Bremerton Gas Works

1952/53

MGP operational area ~1 acre





Current Conditions and Historical Features



Previous Investigations

- 1995 – Ecology Field Inspection, Sesko Property
 - Analysis of three surface soil and one surface sediment sample
- 2007 – Preliminary Upland Assessment
 - 8 borings completed as monitoring wells
 - Analysis of soil and groundwater samples
- 2008 – Targeted Brownfield Assessment
 - 7 borings, 2 completed as monitoring wells
 - Analysis of soil, surface sediment and groundwater samples

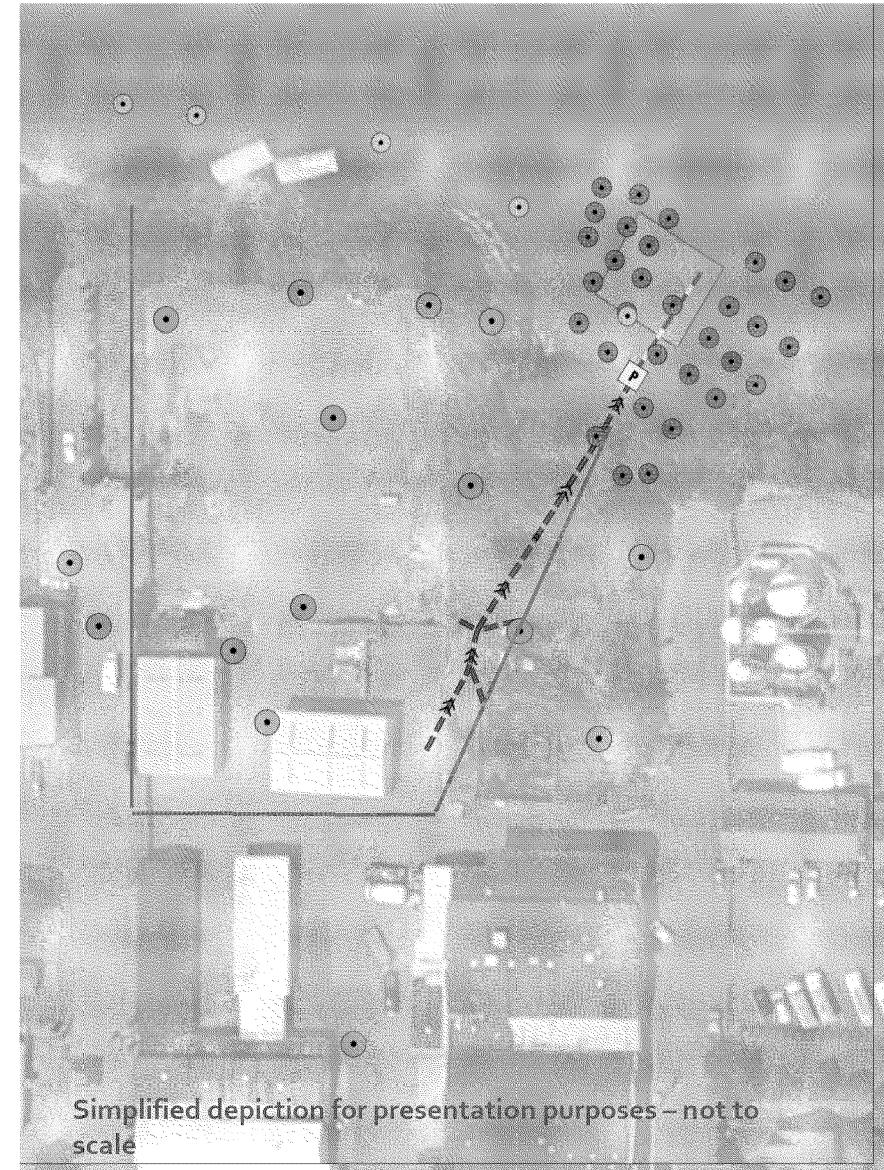


Time Critical Removal Action (2010 TRCA)

Actions Taken

- Former Drainage Line cut and plugged
- Mat placement

- Soil and Groundwater
- Explorations
- Ecology and Environment (2009)
- Ecology and Environment (2010)



2010 TCRA

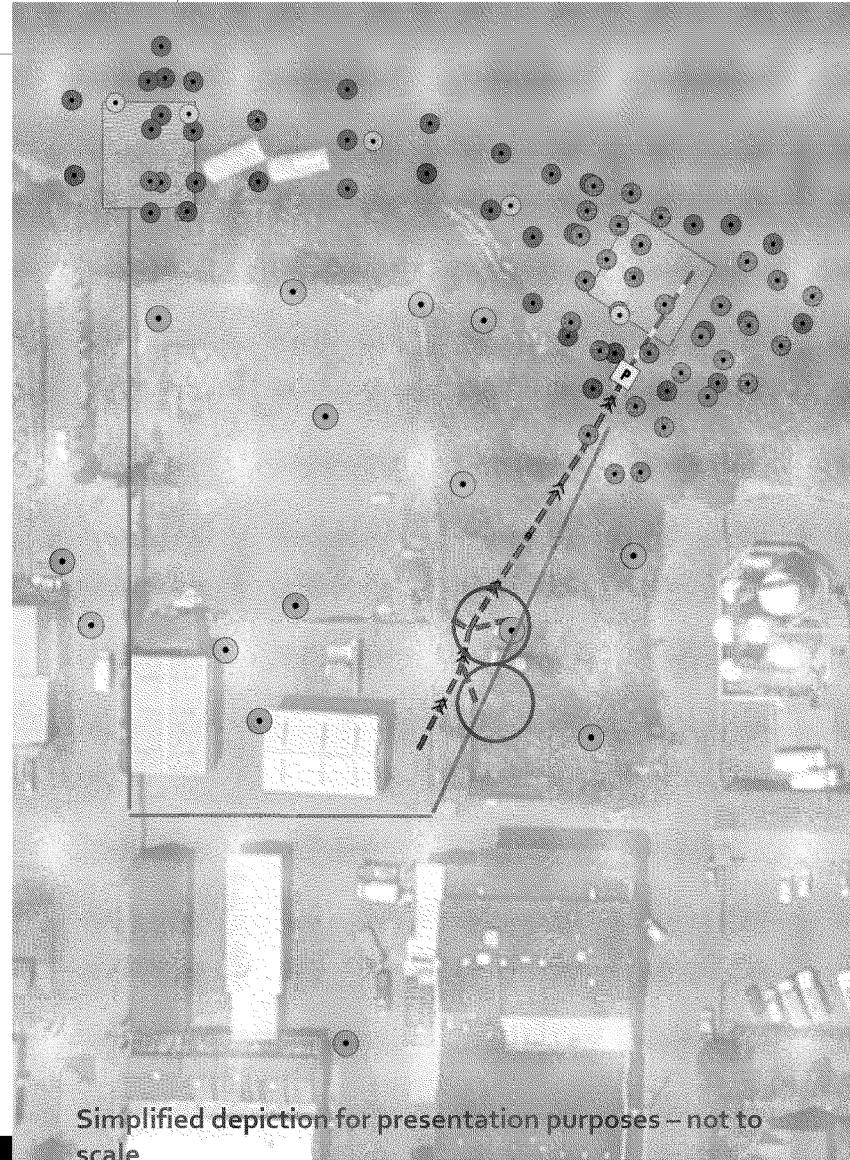


2013 Time Critical Removal Action (2013 TCRA)

Actions Taken

- Placing 2nd mat
- Capping of Manhole A
- Plugging the drain

- Soil and Groundwater Explorations
- Ecology and Environment (2009)
- Ecology and Environment (2010)
- Anchor QEA (2013)



2013 TCRA

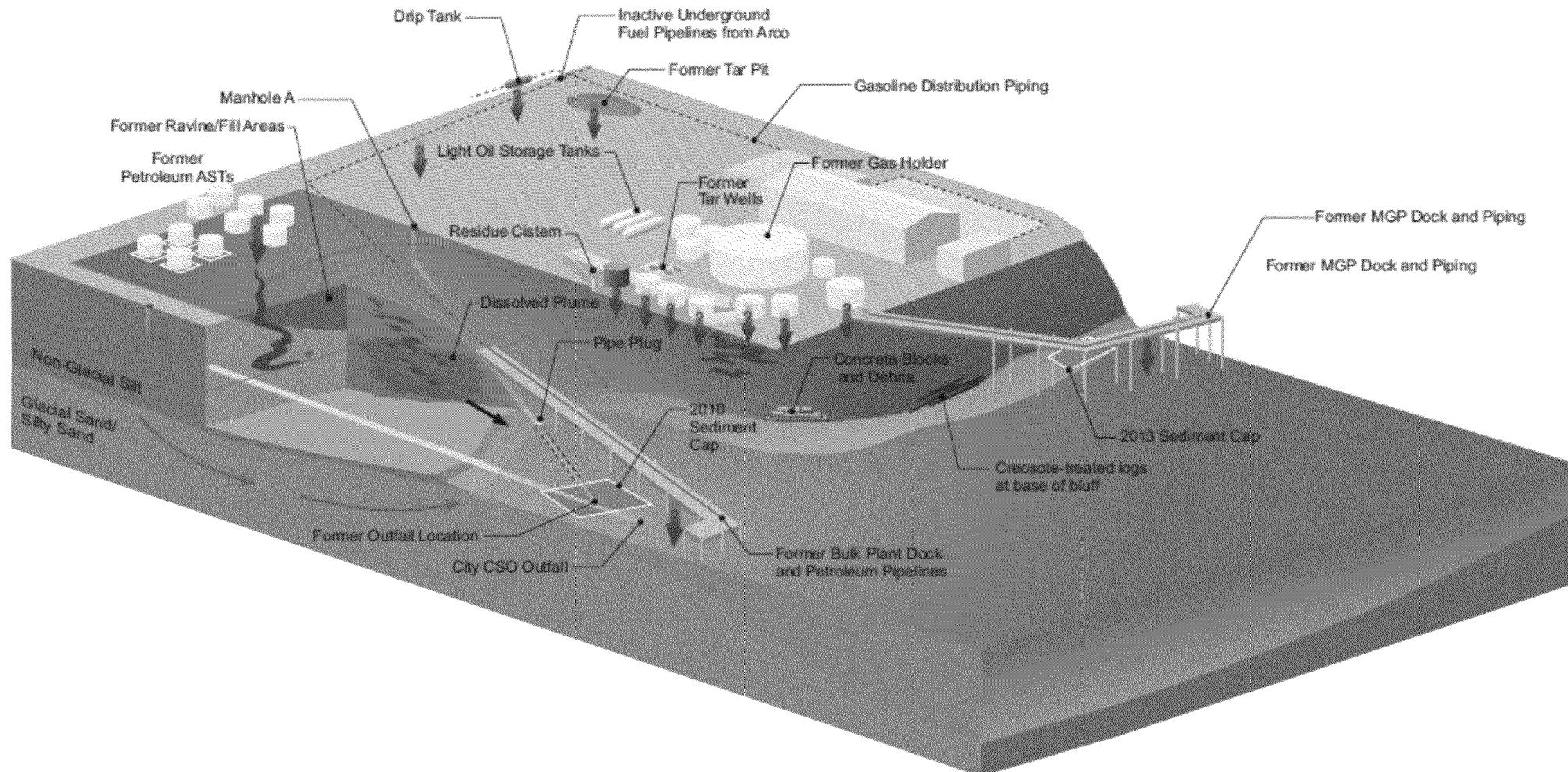


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2013 TCRA

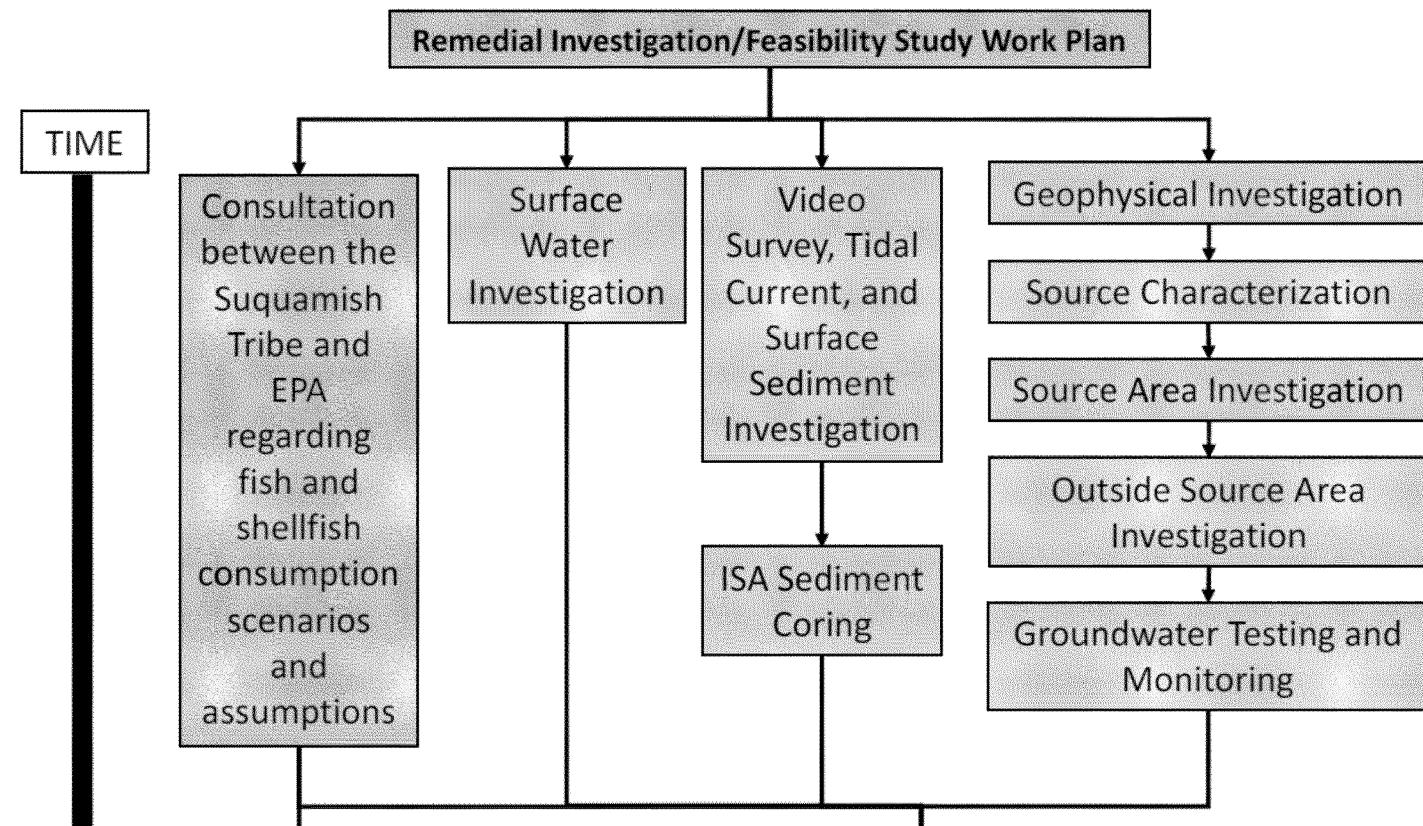


Preliminary Conceptual Site Model



RI-FS Work Plan

- The RI/FS Work Plan was approved in May 2017
- Field work commenced in summer 2017 and is ongoing
- Initial data assessment and evaluations are underway



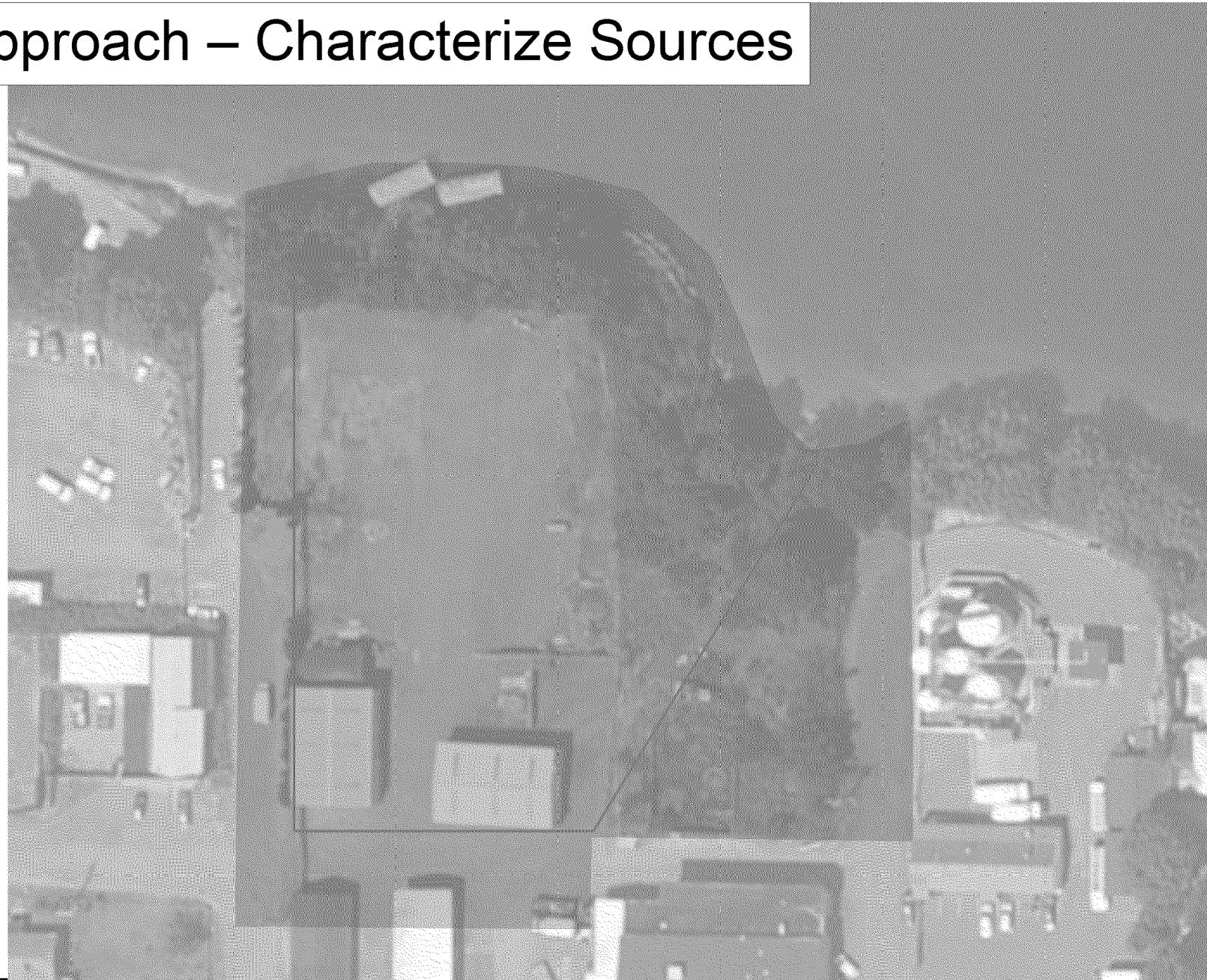
Upland Investigation Approach – Characterize Sources

Surface explorations:

- Geophysics, utility location and survey

Source investigation:

- Trenches/cross-trenches for lateral limits
- Borings for vertical limits



Upland Investigation Approach – Outside Source Areas

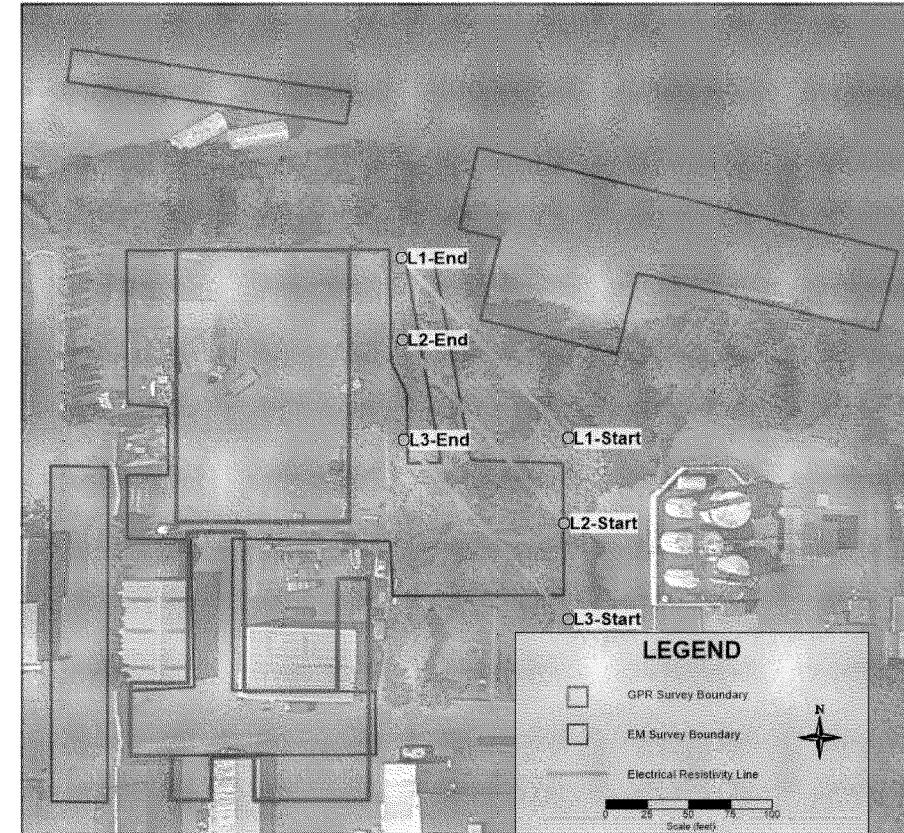
Deep investigation for hydrogeologic CSM

- Deep borings/wells for lithology, groundwater flow
- Downgradient of Source Areas: boring transects to locate monitoring wells
- Lateral limits of contamination:
 - ISM sampling and/or soil borings
 - 'Boundary' monitoring wells



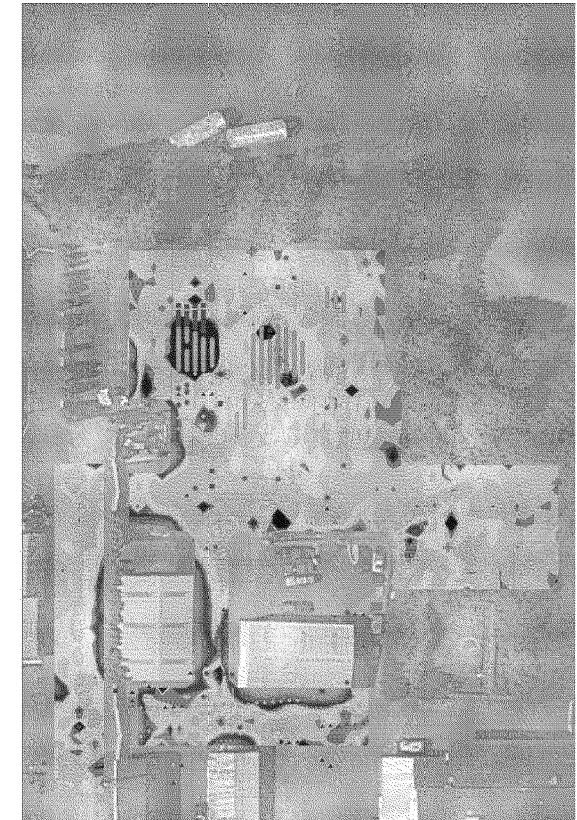
Geophysical Survey Areas

- Ground Penetrating Radar (GPR) and Electromagnetic (EM) surveys: detect subsurface anomalies
- Electrical Resistivity (ER) survey: depth of fill in former ravine



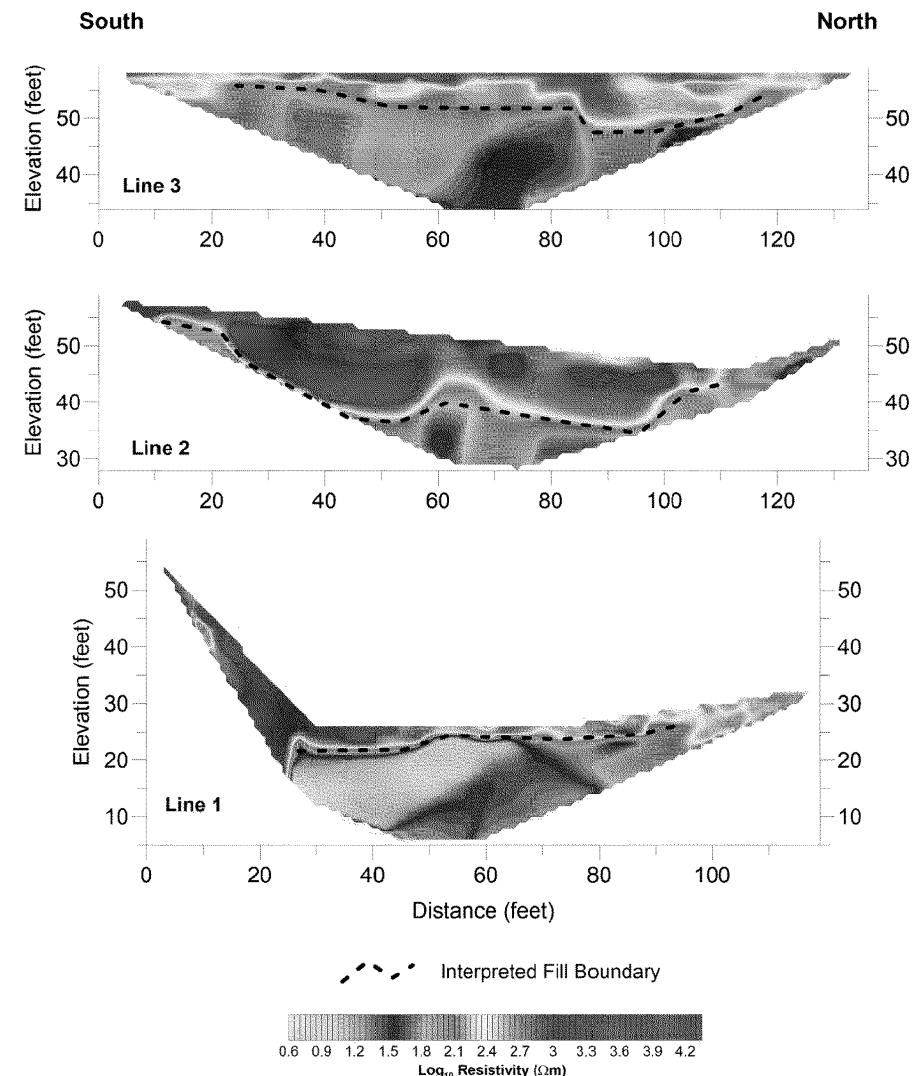
Geophysical Surveys – GPR/EM Results

- Many anomalies consistent with utilities and former structure/tank foundation locations
- Some trench locations added or adjusted to match identified anomalies



Geophysical Surveys – Electrical Resistivity Results

- Estimated depth of fill - up to ~15'



Remedial Investigation Upland Explorations (Through Feb. 2018)

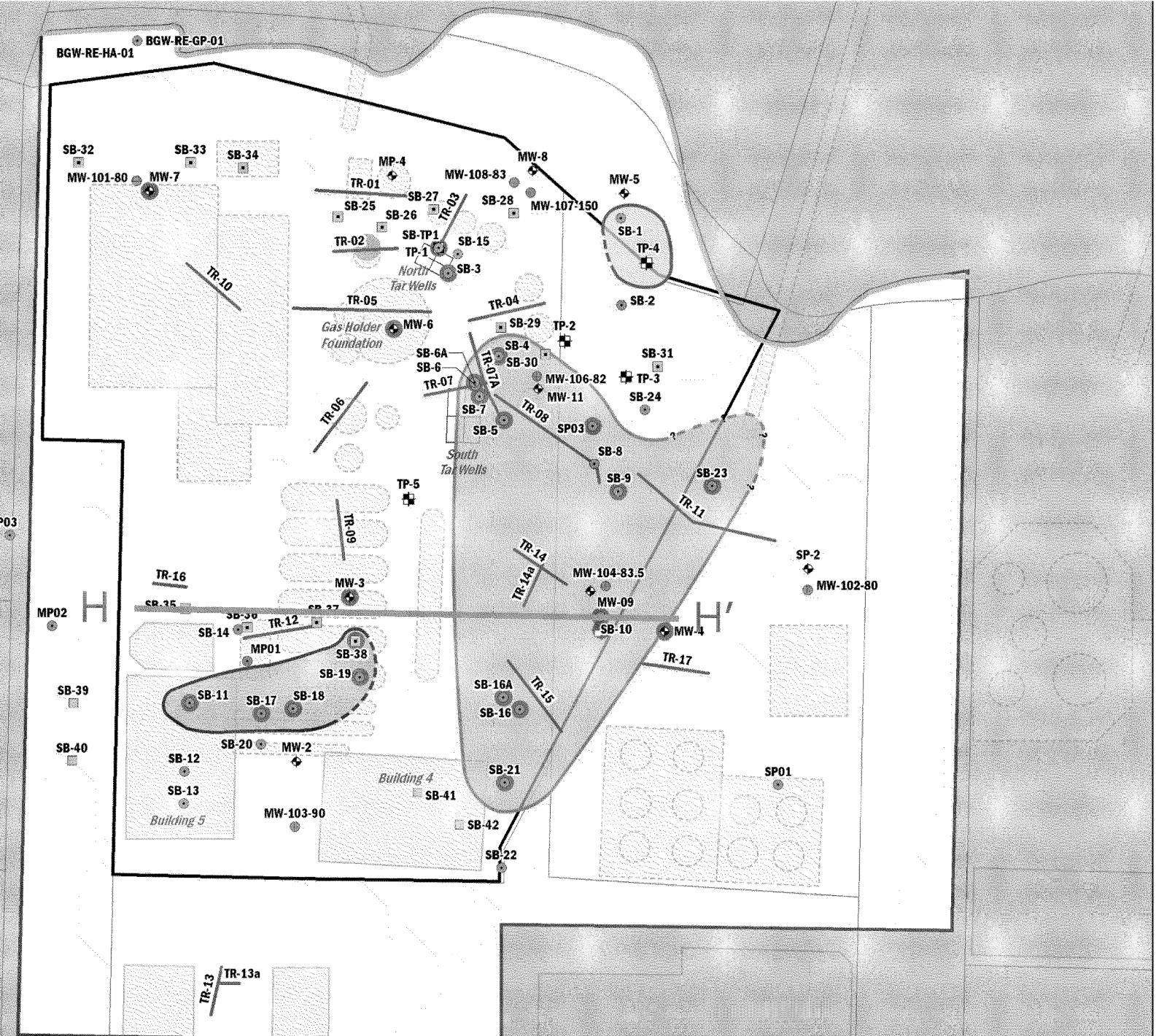
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Explorations

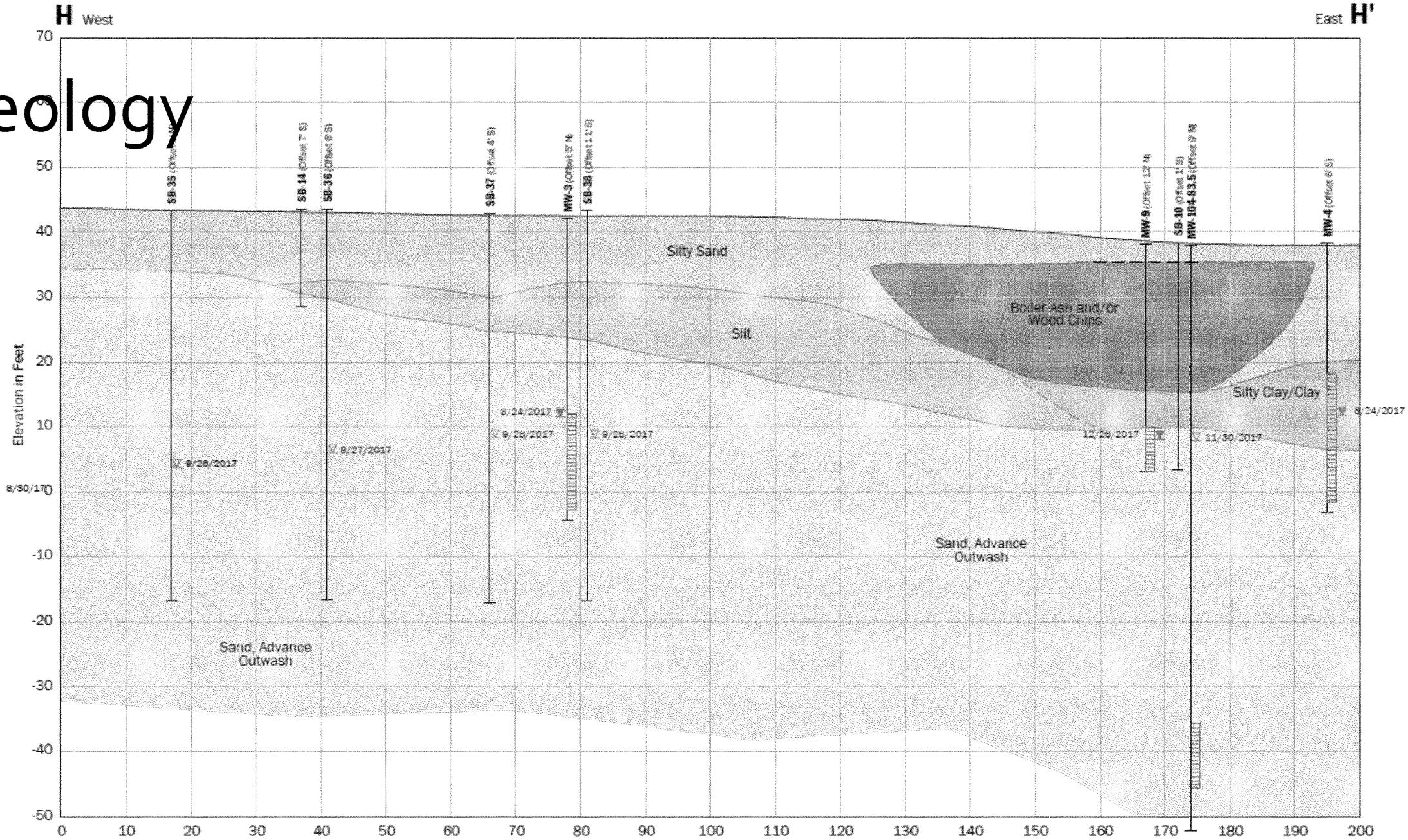
- Existing Deep Monitoring Well
 - ◆ Existing Water Table Monitoring Well
 - Source Investigation Boring
 - ▨ Source Characterization Boring
 - Soil Boring
 - Test Pit
 - ▨ Manhole A Test Pit
 - Trench

Generalized Areas of Potential Source Material

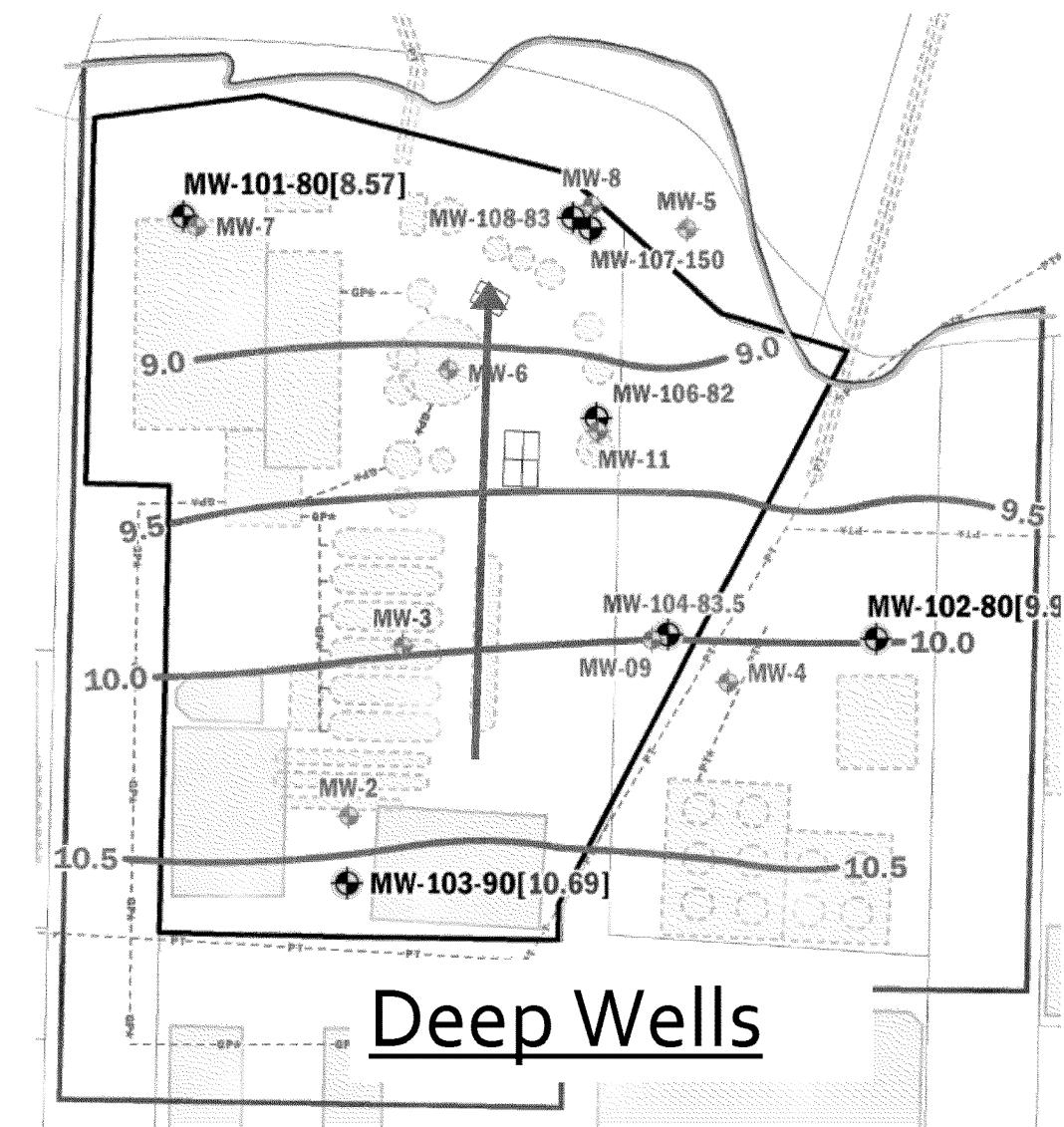
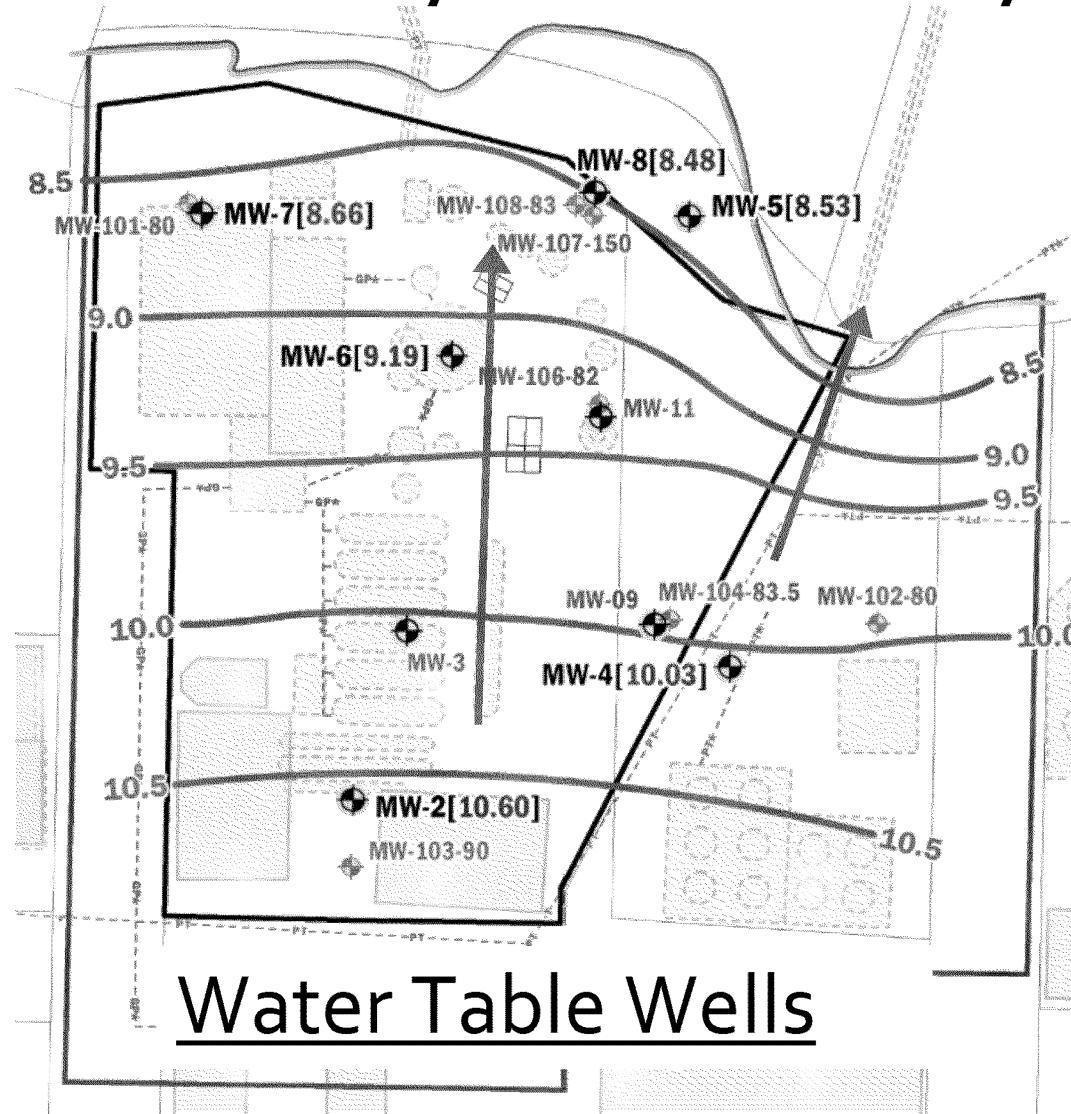
-  Boiler Ash
 -  Boiler Ash, Woodchips, and/or NAPL
 -  NAPL Stringers
 -  NAPL Observed
 -  Solid Tar-Like Material Observed



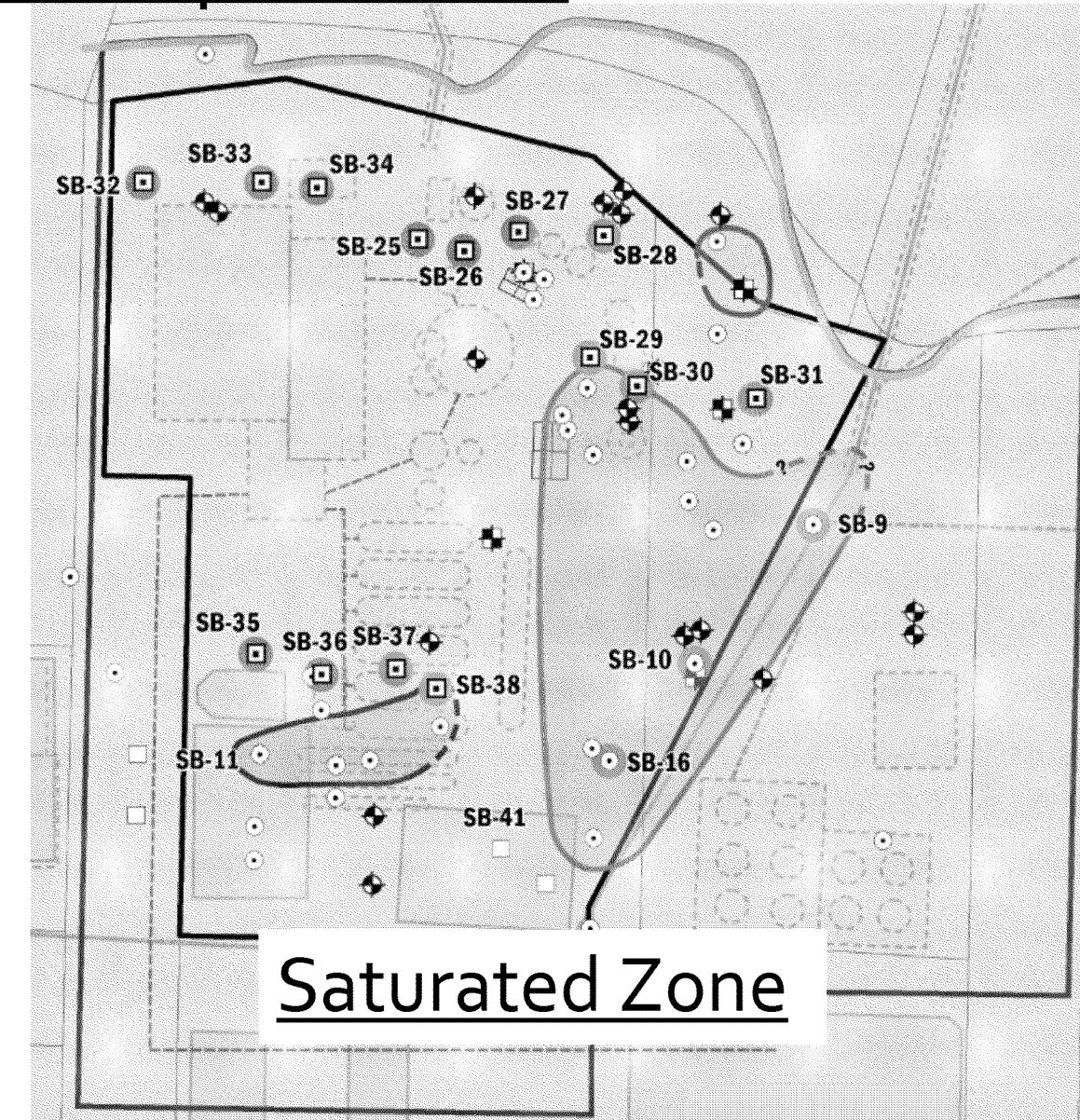
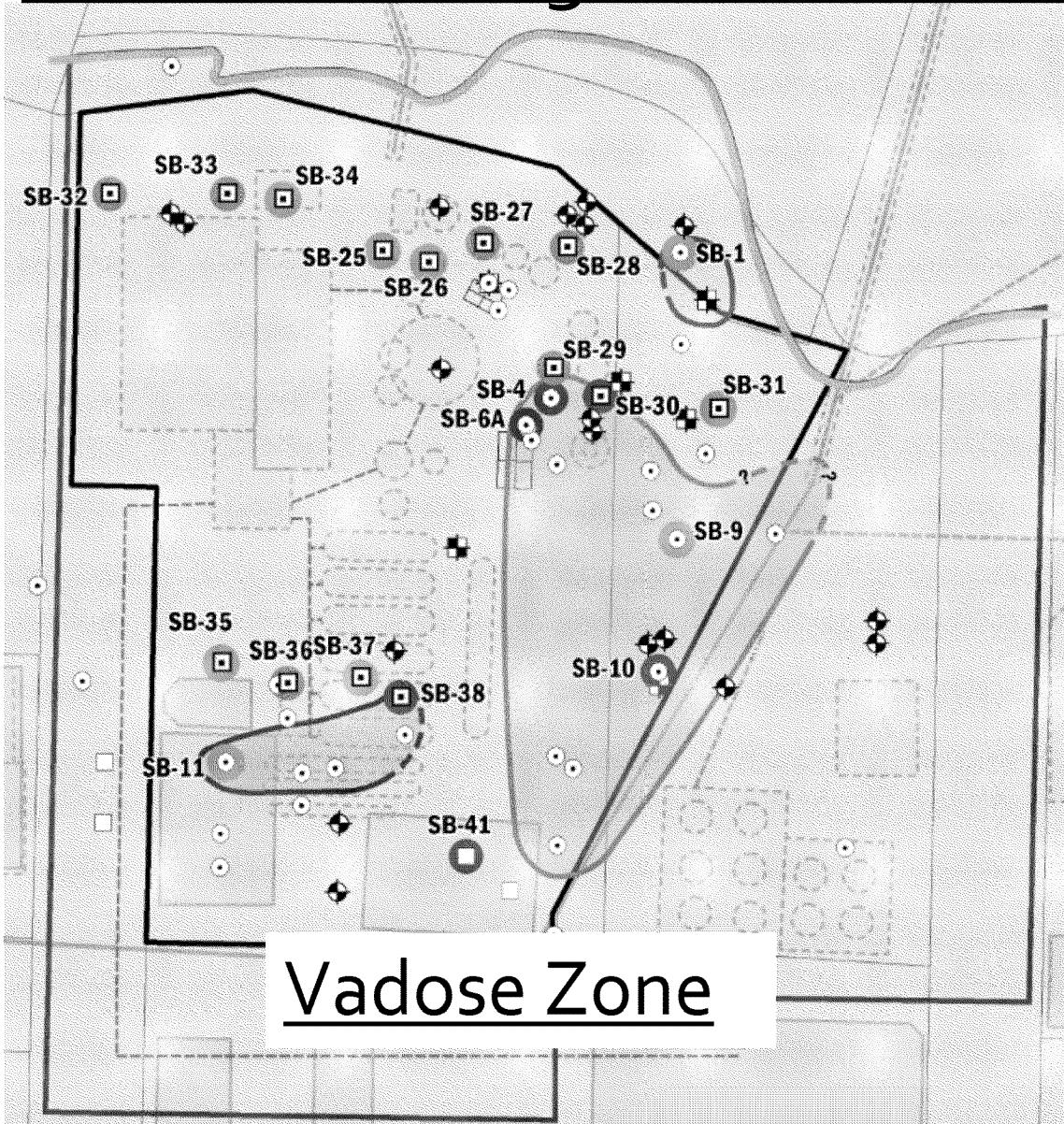
Geology



Preliminary Tidal Study

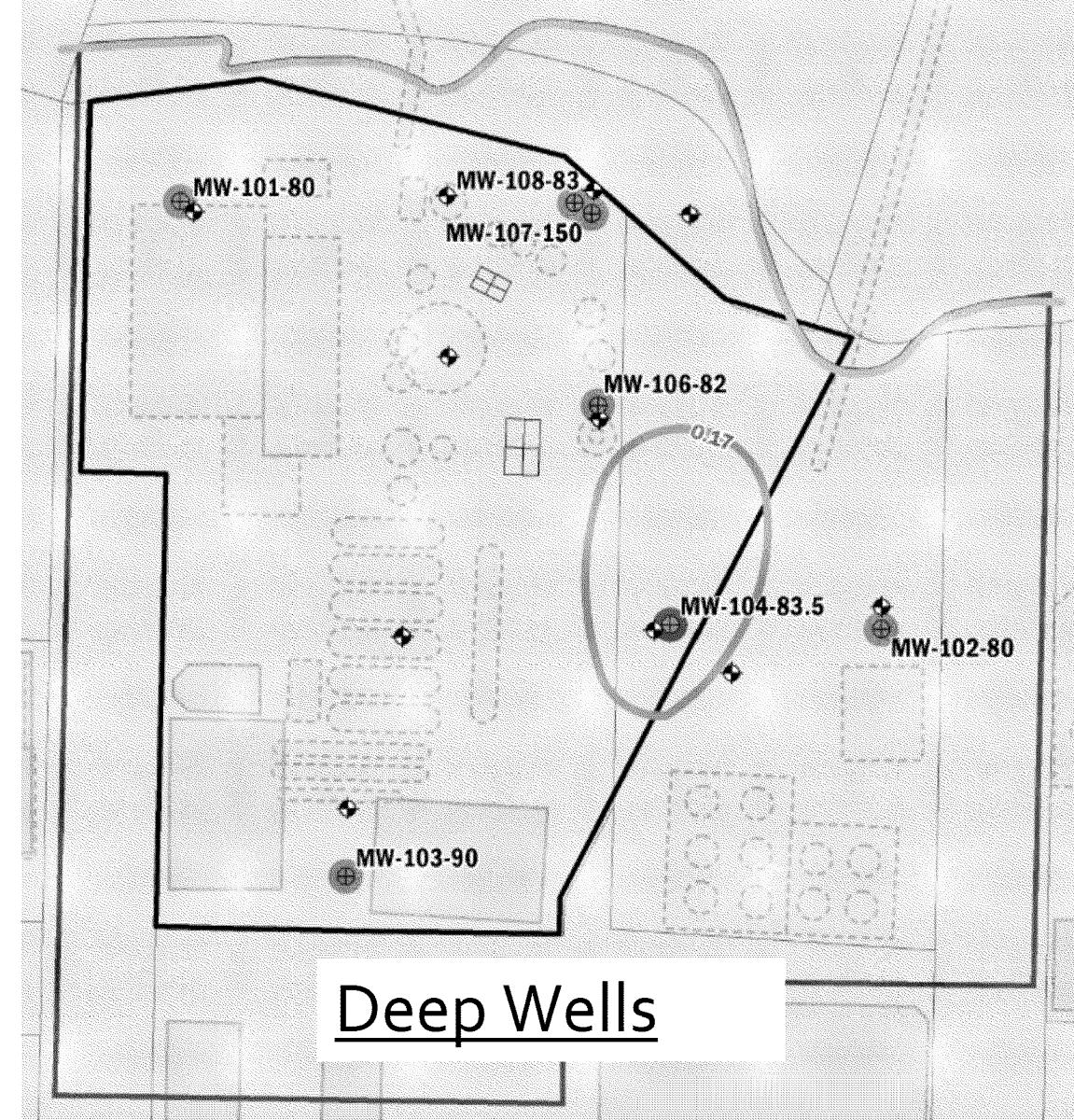
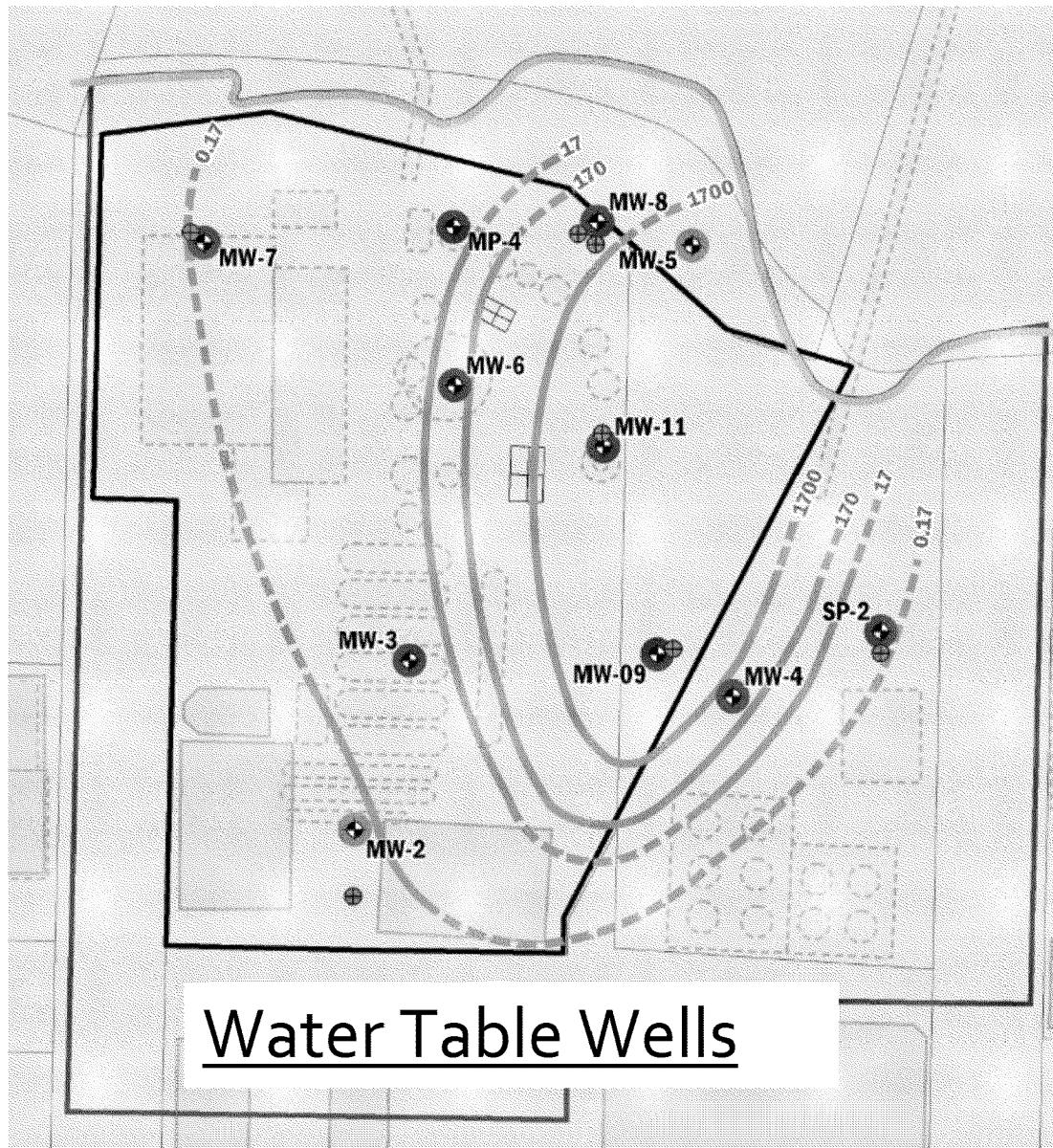


Source Investigation Soil Data - Naphthalene



Source Investigation Groundwater Data - Naphthalene

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Key Upland RI Findings

- Source Materials Identified:
 - Boiler ash and spent purifier media (wood chips) in former ravine fill.
 - NAPL in and beneath former ravine fill – maximum depth 34 feet.
 - NAPL stringers in shallow soil in southwest corner.
- Primary constituents of concern: PAHs, BTEX and cyanide.
- Groundwater ~30 feet deep, in Advance Outwash (dense sand/silty sand).
- The Advance Outwash extends to >200 feet bgs (maximum depth explored).
- Maximum depth of soil and groundwater contamination ~90 feet.

Upcoming Upland Work

- Determine Lateral Extent of Contamination
 - Additional monitoring wells
 - Soil sampling
- Quarterly Groundwater Monitoring
- Tidal Study and Hydraulic Conductivity Testing

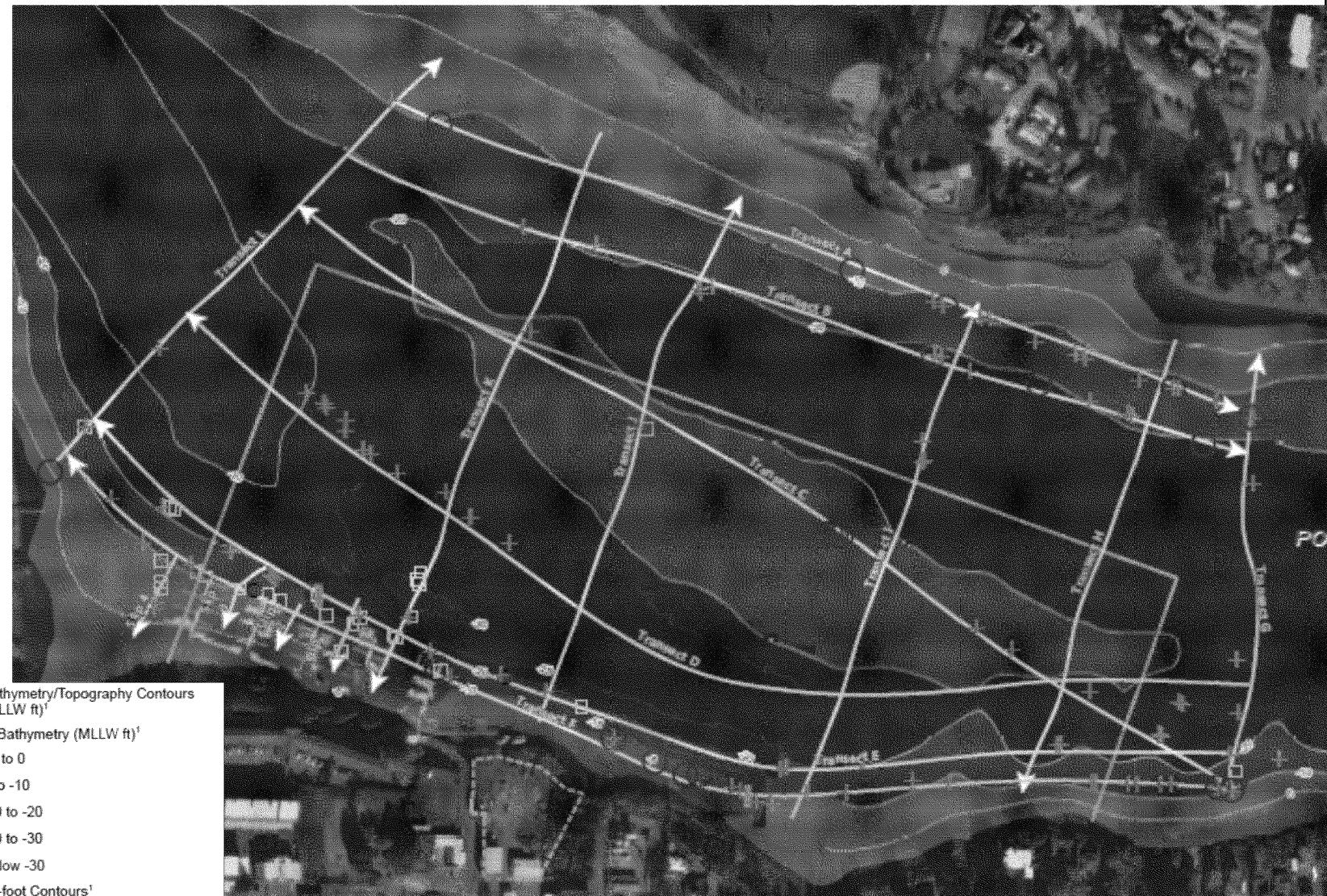
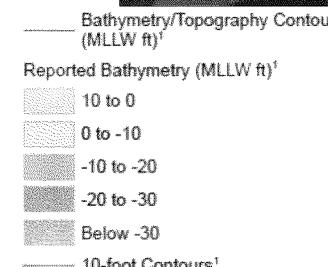
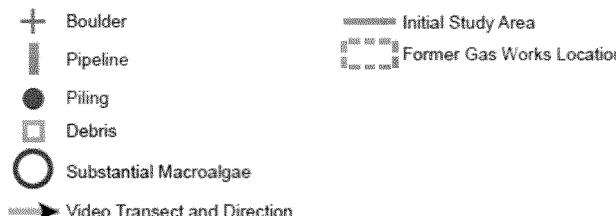
Marine Investigation Areas

- Initial Study Area (ISA)
 - Physical, habitat, and chemical evaluations
- Port Washington Narrows (PWN)
 - Sediment physical testing to evaluate sediment transport
 - Surface water chemistry



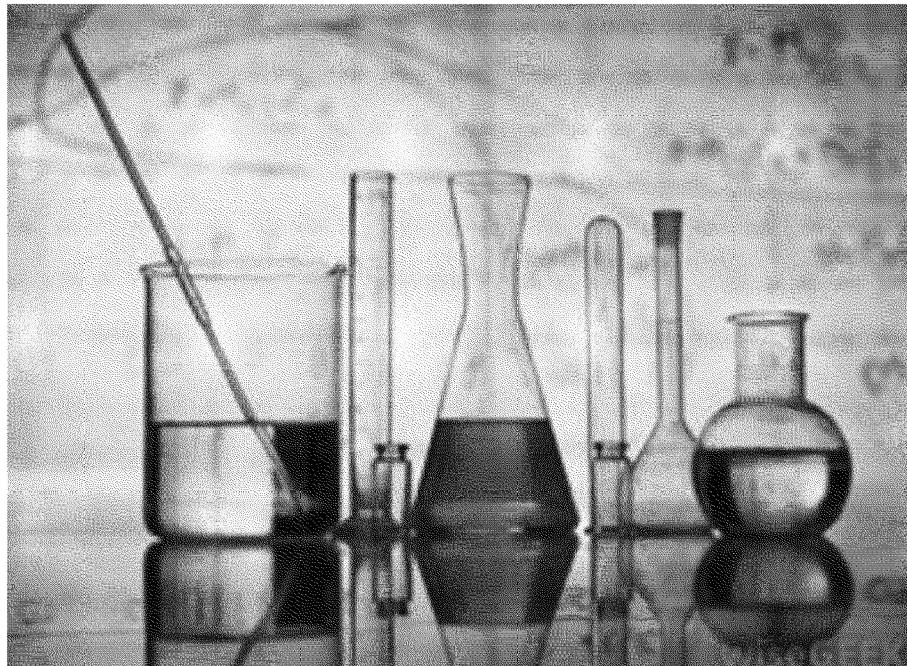
Marine Investigation Surveys

- Physical Surveys
Conducted Summer
2017
 - Video transects
 - Shellfish transects
 - Current velocity
profiles



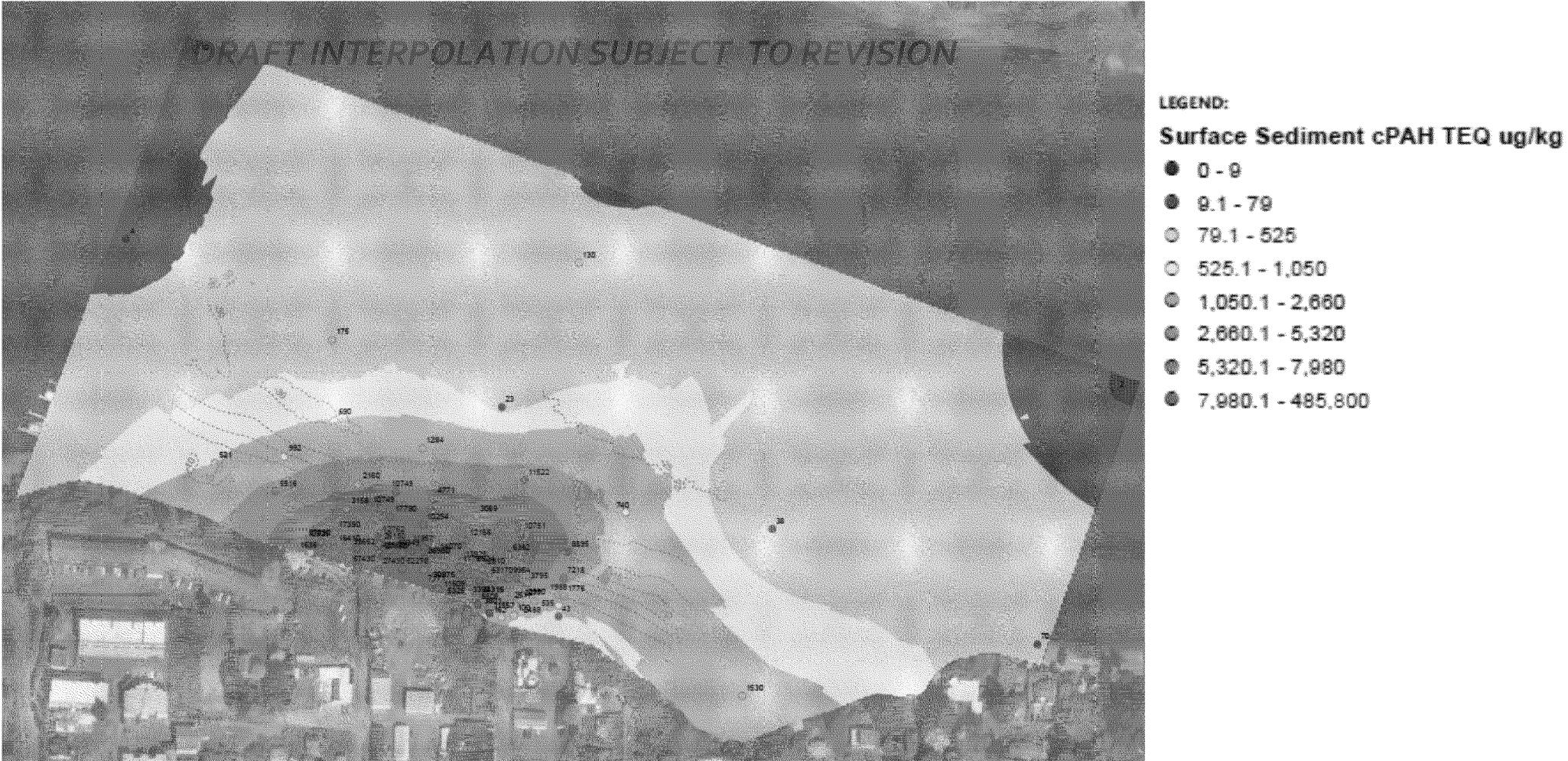
Marine Chemical Results

- Sediment and Sampling and Analysis:
 - Conventionals in ISA and Port Washington Narrows
 - Within ISA Full Suite Testing for:
 - Metals
 - VOCs (tiered testing)
 - SVOCs
 - Pesticides
 - PCB Aroclors (tiered congener testing)
 - Pesticides
 - Dioxin/furans (tiered testing)
 - PAHs
- Surface Water in ISA and Port Washington Narrows (full suite)



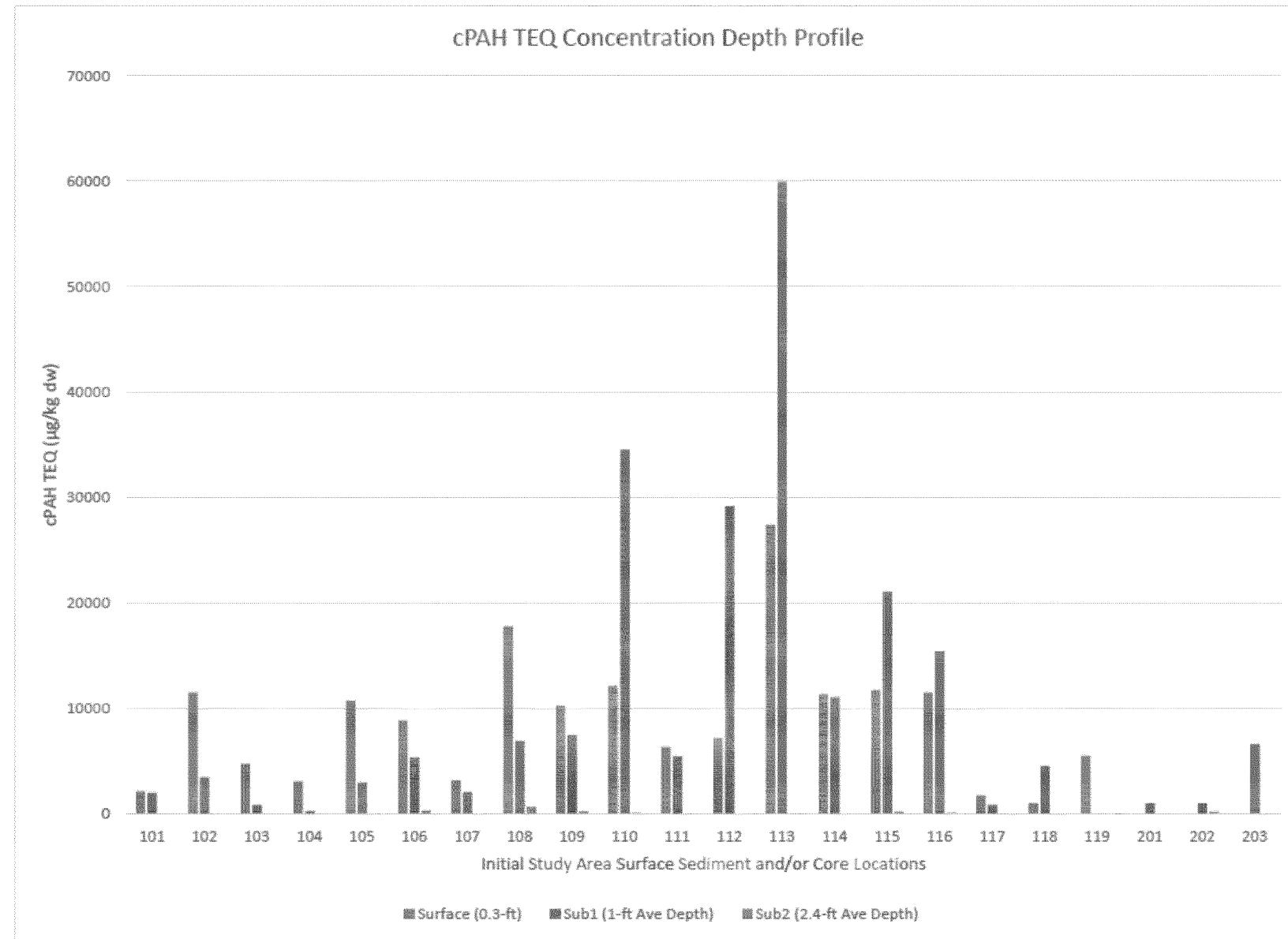
Surface Sediment PAH Results

- Initial evaluations suggest PAHs are the most significant chemical class within the ISA, as anticipated



Subsurface Sediment PAH Results

- Subsurface cPAH concentrations reduce rapidly with depth
- More than half of deepest core interval below natural background levels



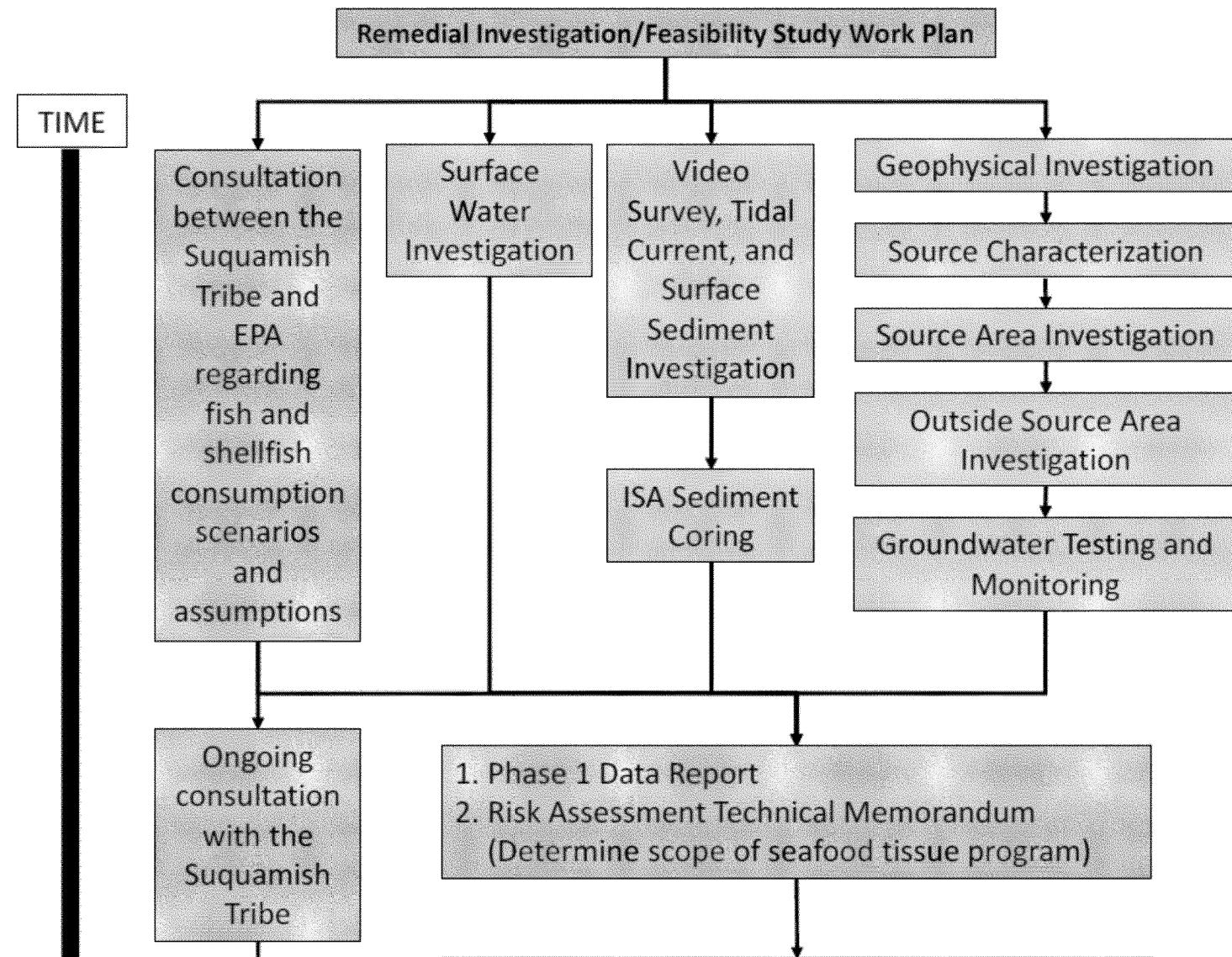
Ongoing Characterization and Next Steps

Ongoing Programs

- **Groundwater testing**

Next Steps

- **Outside Source Area Soil Investigation**
- **Risk Assessment Scoping**



Current Project Schedule

